RIVER CONTINUUM CONCEPT AS AN ANALYTICAL TEMPLATE FOR ASSESSING WATERSHED HEALTH

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Understanding the theoretical framework of a river as an ecological continuum provides a fundamental base for measuring ecosystem dynamics and for providing watershed management strategies. We used the River Continuum Concept as an analytical template for conducting assessments in an urban-agricultural system. Our goals were to identify streams in need of restoration, and most importantly, to identify water quality endpoints that are representative of relatively undisturbed conditions. We used Geographic Information Systems and statistical analysis to explore physical, chemical, and biological attributes of 110 sites throughout the sixth-order Wheeling Creek watershed, WV, USA. From headwaters to mouth, many of the changes in macroinvertebrate community function were in agreement with the predictions of the River Continuum Concept. For instance, leaf shredders comprised an average of 30% of macroinvertebrate abundance in first-order streams, and declined predictably with means of 12, 5, 2, and 0.5% in second through fifth-order streams. However, shredder abundance in second-order streams ranged from 5 to 80% of the communities, with extreme measures representing agricultural versus forested landscapes. Plotting functional group compositions against continuous geomorphological variables provided models of expected community function while accounting for natural changes in the biological community due to changes in geomorphology. Physical and chemical attributes of streams that exceed functional group endpoints provided water quality targets for restoration, whereas streams that failed to meet expectations were targeted for restoration.